

Serial Number: 08/984,099

*E*  
*Sub*  
*ft*

a) nucleotides 65-4163 of SEQ ID NO:7,  
b) SEQ ID NO:15, and  
c) a DNA sequence which hybridizes with SEQ ID NO:15 [or nucleotides 65-4163 of SEQ ID NO:7] under conditions comprising hybridization in a solution comprising 50% formamide, 5X SSC, 0.1% SDS, 5 mM EDTA, 10X Denhardt's solution, and 25 mM sodium phosphate at pH 6.5 with 250  $\mu$ g/ml carrier DNA, and washing in 2X SSC, 0.1% SDS at 42°C for 3 x 30 minutes.

---

2. (Reiterated) The DNA sequence according to Claim 1, further comprising a transport signal encoding sequence from a plant nuclear-encoded gene.

3. (Reiterated) The DNA sequence according to Claim 2, wherein said transport signal encoding sequence comprises a plastid transit peptide.

4. (Reiterated) The DNA sequence according to Claim 1, wherein said DNA sequence further comprises as an operably joined component a transport signal encoding sequence for a signal peptide which provides for transport across the rough endoplasmic reticulum.

5. (Reiterated) The DNA sequence according to Claim 4, wherein said DNA sequence further comprises as an operably joined component, 3' to said open reading frame, a vacuolar localization signal.

6. (Reiterated) The DNA sequence of Claim 1 wherein said pigment is melanin or indigo.

7. (Reiterated) The DNA sequence of Claim 1 wherein said open reading frame is from a bacterial or a plant gene.

Serial Number: 08/984,099

8. (Reiterated) The DNA sequence of Claim 7 wherein said gene is selected from the group consisting of ORF438, *tyrA*, anthocyanin R gene, anthocyanin C1 gene, *pig*, and *tna*.

9. (Reiterated) A DNA construct comprising a DNA sequence of Claim 1.

10. (Reiterated) A DNA construct comprising two DNA sequences according to Claim 1, wherein said protein in a biosynthesis pathway in each of said two DNA sequences is not encoded by the same gene.

12. (Reiterated) A plant cell comprising a DNA construct of Claim 9.

13. (Reiterated) A plant comprising a cell of Claim 12.

14. (Reiterated) A method of modifying fiber phenotype in a cotton plant, said method comprising:

transforming a plant cell with a DNA construct according to Claim 9 or 10; and  
growing said plant cell to produce a plant comprising fiber tissue, wherein said fiber tissue comprises a substrate of said protein in a pigment biosynthesis pathway, and wherein said protein reacts with said substrate to produce said pigment, whereby the phenotype of said fiber is modified.

15. (Reiterated) The method of Claim 14 wherein said DNA construct further comprises a transport signal encoding sequence from a plant nuclear-encoded gene.

16. (Reiterated) The method of Claim 14 wherein said DNA construct further comprises a transport signal encoding sequence, which encodes a signal peptide which provides for transport across the rough endoplasmic reticulum.

Serial Number: 08/984,099

18. (Reiterated) The method of Claim 16 wherein said DNA comprises constructs for expression of two proteins in a pigment biosynthesis pathway wherein said two proteins are not encoded by the same gene.
19. (Reiterated) The method of Claim 18 wherein said pigment is melanin and said proteins are encoded by *tyrA* and ORF438.
20. (Reiterated) The method of Claim 18 wherein said pigment is indigo and said proteins are encoded by *tma* and *pig*.
21. (Reiterated) The method of Claim 18 wherein said pigment is anthocyanin and said two proteins are the anthocyanin R and C1 proteins.
22. (Reiterated) The method of Claim 14 wherein said fiber tissue is a cotton burr.
23. (Allowable) A recombinant DNA construct comprising the cotton tissue transcriptional sequence shown in SEQ ID NO: 7.
24. (Allowable) A recombinant DNA construct comprising the cotton tissue transcriptional sequence shown in SEQ ID NO: 15.
25. (Allowable) An isolated DNA comprising the nucleotide sequence shown in SEQ ID NO: 1.
26. (Allowable) An isolated DNA comprising the nucleotide sequence shown in SEQ ID NO: 12.
28. (Reiterated) The DNA sequence according to Claim 1, wherein said transcriptional factor is obtained by the method of probing a genomic library derived from a plant fiber tissue.

Serial Number: 08/984,099

30. (Reiterated) The DNA sequence according to Claim 59, further comprising a transport signal encoding sequence from a plant nuclear-encoded gene.

31. (Reiterated) The DNA sequence according to Claim 30, wherein said transport signal encoding sequence comprises a plastid transit peptide.

32. (Reiterated) The DNA sequence according to Claim 59, further comprising a transport signal encoding sequence for a signal peptide which provides for transport across the rough endoplasmic reticulum.

33. (Reiterated) The DNA sequence according to Claim 32, wherein said sequence further comprises, 3' to said open reading frame, a vacuolar localization signal.

34. (Reiterated) The DNA sequence of Claim 57 wherein said open reading frame is from a bacterial gene.

35. (Reiterated) The DNA sequence of Claim 34 wherein said bacterial gene is selected from the group consisting of ORF438, *tyrA*, *pig*, and *tna*.

36. (Reiterated) A DNA construct comprising a DNA sequence of Claim 59.

37. (Reiterated) The DNA construct of Claim 36 wherein said cotton plant cell is a cotton fiber cell.

38. (Reiterated) A plant cell comprising a DNA construct of Claim 36.

39. (Reiterated) A plant comprising a plant cell of Claim 38.

42. (Reiterated) The DNA sequence according to Claim 59 wherein said transcriptional factor is obtained by the method of probing a genomic library derived from a plant fiber tissue.

*Sub  
F197*  
44. (Thrice Amended) A DNA sequence comprising as operably joined components in the direction of transcription, a transcriptional factor functional in a cotton plant cell and an open reading frame encoding an enzyme in a biosynthetic pathway of melanin or indigo, wherein said transcriptional factor is selected from the group consisting of:  
a) nucleotides 65-4163 of SEQ ID NO:7,  
b) SEQ ID NO:15, and  
c) a DNA sequence which hybridizes with SEQ ID NO:15 [or nucleotides 65-4163 of SEQ ID NO:7] under conditions comprising hybridization in a solution comprising 50% formamide, 5X SSC, 0.1% SDS, 5 mM EDTA, 10X Denhardt's solution, and 25 mM sodium phosphate at pH 6.5 with 250  $\mu$ g/ml carrier DNA, and washing in 2X SSC, 0.1% SDS at 42°C for 3 x 30 minutes.

45. (Reiterated) The DNA sequence according to Claim 44, further comprising a transport signal encoding sequence from a plant nuclear-encoded gene.

46. (Reiterated) The DNA sequence according to Claim 45, wherein said transport signal encoding sequence comprises a plastid transit peptide.

47. (Reiterated) The DNA sequence according to Claim 44, further comprising a transport signal encoding sequence for a signal peptide which provides for transport across the rough endoplasmic reticulum.

48. (Reiterated) The DNA sequence according to Claim 47, wherein said sequence further comprises, 3' to said open reading frame, a vacuolar localization signal.

49. (Reiterated) The DNA sequence of Claim 44 wherein said open reading frame is from a bacterial gene.

50. (Reiterated) The DNA sequence of Claim 49 wherein said bacterial gene is selected from the group consisting of ORF438, *tyrA*, *pig*, and *tna*.

51. (Reiterated) A DNA construct comprising a DNA sequence of Claim 44.

52. (Reiterated) The DNA construct of Claim 51 wherein said cotton plant cell is a cotton fiber cell.

53. (Reiterated) A plant cell comprising a DNA construct of Claim 51.

54. (Reiterated) A plant comprising a plant cell of Claim 53.

55. (Reiterated) The DNA sequence according to Claim 44 wherein said transcriptional factor is obtained by probing a genomic library derived from a plant fiber tissue.

*SUB*  
*F247* 57. (Thrice Amended) A DNA sequence comprising as operably joined components in the direction of transcription, a transcriptional factor functional in a cotton fiber cell and an open reading frame encoding an enzyme in the biosynthetic pathway of a pigment, wherein said transcriptional factor is selected from the group consisting of:

a) nucleotides 65-4163 of SEQ ID NO:7,  
b) SEQ ID NO:15, and  
c) a DNA sequence which hybridizes with SEQ ID NO:15 [or nucleotides 65-4163 of SEQ ID NO:7] under conditions comprising hybridization in a solution comprising 50% formamide, 5X SSC, 0.1% SDS, 5 mM EDTA, 10X Denhardt's solution, and 25 mM sodium

*E3*  
Serial Number: 08/984,099

phosphate at pH 6.5 with 250  $\mu$ g/ml carrier DNA, and washing in 2X SSC, 0.1% SDS at 42°C for 3 x 30 minutes.

*Sup F257*  
59. (Twice Amended) A DNA sequence comprising a transcriptional factor functional in a cotton plant cell, wherein said transcriptional factor is selected from the group consisting of:  
a) nucleotides 65-4163 of SEQ ID NO:7,  
b) SEQ ID NO:15, and  
c) a DNA sequence which hybridizes with up to the full length of SEQ ID NO:15 [or nucleotides 65-4163 of SEQ ID NO:7] under conditions comprising hybridization in a solution comprising 50% formamide, 5X SSC, 0.1% SDS, 5 mM EDTA, 10X Denhardt's solution, and 25 mM sodium phosphate at pH 6.5 with 250  $\mu$ g/ml carrier DNA, and washing in 2X SSC, 0.1% SDS at 42°C for 3 x 30 minutes.

*E4*  
61. (Allowable) A recombinant DNA construct comprising the cotton tissue transcriptional sequence shown in SEQ ID NO: 11.

65. (Reiterated) An isolated DNA comprising the cotton transcriptional sequence shown in SEQ ID NO:7.

66. (Reiterated) An isolated DNA comprising the cotton transcriptional sequence shown in SEQ ID NO:15.

#### REMARKS

##### The Claimed Invention

The claimed invention is directed to methods for modifying fiber phenotype in a cotton plant, together with DNA sequences and constructs for use in the method and plant cells and plants produced using the method.